Claims

1. A relief structure alignment layer comprising a relief structure surface incorporating at least one indentation, the at least one indentation having an internal surface extending from the relief structure surface, wherein the relief structure alignment layer has a surface memory alignment layer arranged to impart a preferred liquid crystal director alignment to a liquid crystal material in contact therewith.

2. A relief structure alignment layer according to claim 1 wherein the preferred alignment of the liquid crystal director comprises a substantially planar alignment at the internal surface of the at least one indentation, a substantially homeotropic alignment in the bulk of the liquid crystal material and a defect in the liquid crystal alignment associated with each indentation in the absence of a phoretic particle there from.

3. A relief structure alignment layer according to any of the preceding claims comprising a relief structure surface incorporating a plurality of indentations, each indentation having an internal surface extending from the relief structure surface.

4. A relief structure alignment layer according to any of the preceding claims wherein the surface memory alignment layer imposes a substantially planar liquid crystal director alignment at the relief structure alignment layer in the presence of a randomly oriented liquid crystal material.

5. A relief structure alignment layer according to any of the preceding claims wherein the surface memory alignment layer comprises an isotropic material.

6. A relief structure alignment layer according to any of the preceding claims wherein the isotropic material has a surface energy greater than 30 erg/cm^2.

7. A phoretic display comprising a first display surface, a liquid crystal suspension medium, at least one phoretic particle suspended within the suspension medium, and at least one relief structure alignment layer according to any of the preceding claims.

8. A phoretic display according to claim 7 wherein the at least one relief structure alignment layer is arranged at the first display surface.

9. A phoretic display according to claim 8 comprising a second display surface disposed remotely to the first display surface, and a second relief structure alignment layer disposed at the second display surface.

10. A phoretic display according to any of claims 7 - 9 wherein each indentation is dimensioned so as to at least partly receive a phoretic particle.

11. A phoretic display according to claim 9 or 10, wherein each indentation in the relief structure surface of the first relief structure alignment layer is arranged substantially opposite a corresponding indentation in the relief structure surface of the second relief structure alignment layer, said indentations forming an opposing pair of indentations.

12. A phoretic display according to claim 11 wherein each opposing pair of indentations encompasses a phoretic particle.

13. A phoretic display according to any of claims 7 - 12 wherein the liquid crystal suspension medium is capable of adopting a nematic liquid crystal phase.

14. A phoretic display according to claim 13 wherein the liquid crystal suspension medium exhibits a positive anisotropy of dielectric permittivity when in the nematic liquid crystal phase.

15. A phoretic display according to claim 13 or 14 wherein the liquid crystal suspension medium exhibits a positive anisotropy of magnetic permeability when in the nematic liquid crystal phase.

16. A method for configuring a liquid crystal material within a cell having a relief structure alignment layer; the relief structure alignment layer comprising a relief structure surface incorporating at least one indentation, the at least one indentation having an internal surface extending from the relief structure surface, the relief structure alignment layer having a surface memory alignment layer arranged to

interact with an oriented liquid crystal material in contact therewith exhibiting a preferred liquid crystal director alignment and adapted to reproduce said preferred liquid crystal director alignment; the method comprising the steps of

(i) introducing into the cell a liquid crystal material having an isotropic phase,

(ii) applying a field to the display comprising at least one of an electric field and a magnetic field,

(iii) converting the liquid crystal material from the isotropic phase to an oriented liquid crystal phase in the presence of said applied field thereby imparting the preferred alignment of the liquid crystal director within the cell,

(iv) removing the applied field.

17. A method according to claim 16 wherein the oriented liquid crystal phase comprises a nematic liquid crystal phase.

18. A method according to claim 16 or 17 wherein the preferred alignment of the liquid crystal director comprises a substantially planar alignment at the internal surface of the at least one indentation, a substantially homeotropic alignment in the bulk of the liquid crystal material and a defect in the liquid crystal alignment associated with each indentation in the absence of a phoretic particle therefrom.

19. A method according to any of claims 16 - 18 wherein the field is applied in a direction substantially normal to the relief structure alignment layer.

20. A method according to any of claims 16 - 19 wherein the applied field comprises an electric field and the liquid crystal material exhibits a positive anisotropy of dielectric permittivity.

21. A method according to any of claims 16 - 19 wherein the applied field comprises a magnetic field and the liquid crystal material exhibits a positive anisotropy of magnetic permeability.

22. A method according to any of claims 16 - 21 wherein the step of converting the liquid crystal material from the isotropic phase to the oriented liquid crystal phase comprises cooling the liquid crystal material from a temperature above the clearing point T_c of the liquid crystal material.

23. A method according to any of the claims 16 - 22 comprising an additional step of introducing a temporal delay between the step of converting the liquid crystal material from the isotropic phase to the oriented liquid crystal phase and the step of removing the applied field.